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CURRENT LITERATURE

BOOK REVIEWS

Books on coal

In view of the increasing importance of the botanical sciences in connection with the fundamental problems, a general statement in regard to the status of plants in relation to coal will not be without interest to the readers of this journal. Taking first the conservational aspect of the subject, the results of the geological congress held in 1913 in Toronto, Canada, have appeared in three magnificent quarto volumes and a large folio atlas.¹

Although the coal resources of the world are still abundant and exhaustion is in general hundreds of years in the future, still, prudent exploitation of the coal fields is necessary. The account of the coal resources of the various countries of the world are given authoritatively by their geological surveys and bureaus of mines. It is particularly fortunate that this should have happened before the great war has exacerbated international relations to such an extent that cooperation of the kind manifested in this gigantic work is for a long time to come impossible. The summary of the results is made by members of the Geological Survey of Canada. Of particular interest to North Americans is the enormous richness of our coal resources, which, if we include both the United States and Canada, are nearly twice as great as all of the rest of the world combined. In view of the absolutely fundamental relation of coal to modern industrial development the significance of the statistical situation for the northern America continental area can scarcely be overestimated.

The most important recent work on the historical aspects of coal investigation is unquestionably that of STEVENSON.² The author has had prolonged personal experience in connection with the coal deposits of the eastern United States, and has visited a number of the more interesting European formations. The summary of the literature on the subject is admirable, and enables one to realize what an enormously large amount of scientific effort has been expended on the investigation of coal during the past hundred years or more. Two main hypotheses of coal formation have held the ground during that period, namely the autochthonous or *in situ* hypothesis, which attributes to coal the same conditions of formation as ordinary peat; and the allochthonous or transport hypothesis, which regards coal as a sedimentary rock formed in

¹ The coal resources of the world. Toronto: Morang & Co. Ltd. 1913. \$25.00.

² STEVENSON, J. J., Formation of coal beds. Lancaster (Penn.): New Era Printing Co. 1911-1913. \$3.50.

open water. The first hypothesis is almost universally accepted by geologists and has received its main support from German investigations. The transport theory of the origin of coal has always been strongly held in France. The author is clearly in favor of the peat hypothesis (*in situ* or autochthonous theory) and supports his views not only by a summary of the literature, commendable on account of his generous fairness, but also as a result of his own observations carried on during many years in the eastern United States.

We may next consider a work on the recent formations of vegetable deposits comparable to coal at once monumental in extent and in view of the recent decease of its author actually a monument.³ POTONIE divides recent deposits into the so-called Sapropelites, the Humus-Bildungen, and the Liptobioliths. The first are deposits formed under open water by wind and water transport, and correspond to the lacustrine deposits of the allochthonous hypothesis of the origin of coal. The author is far from denying the actual existence of large amounts of vegetable material laid down in open water, and frankly admits that in the tropics, where the ravages of fungi in the case of plant matter not permanently submerged are extremely rapid, such accumulation is the only method of importance. In the case of temperate regions, however, as represented by northern Europe, the true peat (Humus-Bildungen) predominates, constituting extensive bogs, moors, and tundras. POTONIE has made a considerable study of the plant population of peat moors, and his results will doubtless be of great interest to students of plant geography and ecology. Liptobioliths are the persistent, resinous, waxy, or cutinous remains of plants which survive under the most unfavorable conditions as a result of their resistance to the organisms of decay. The author comes to the conclusion, as a result of his studies of recent accumulations of vegetable matter, that coal has been formed for the most part from autochthonous peat (Humus-Bildungen), and thus puts himself in line with the hypothesis most generally acceptable to geologists at the present time.

An American work dealing with the subject of coal of quite unusual interest and significance is a recent bulletin of the United States Bureau of Mines.⁴ This work represents the cooperation, as rare as it is desirable, of a geologist, a botanist specially qualified in connection with the study of peat, and a histologist trained in the laboratories of the University of Chicago, who has given special attention to the actual organization of coal. The plates accompanying the article are numerous and represent a degree of progress in the difficult technique of the study of coal hitherto not found in any governmental publication. On account of the different points of view of the authors the results are not altogether harmonious. Perhaps the most interesting data,

³ POTONIE, H., Die rezenten Kaustobiolithe und ihre Lagerstaetten. 3 vols. Berlin. 1908, 1911, and 1912. M. 8, 10, and 14 respectively.

⁴ WHITE, DAVID, DAVIS, C. A., and THIESSEN, R., The origin of coal. Bull. 38, U.S. Bureau of Mines. 1915.

next to those put forward by THIESSEN in connection with the microscopic study of coal, are those of WHITE in regard to the formation of anthracites as the result rather of thrust action than of heat devolatilization, and of DAVIS as to the origin of vegetable accumulations in the United States, which he considers to have been formed mainly under open water. DAVIS' conclusions in regard to the origin of our peat accumulations are all the more interesting as he accepts the orthodox geological view of German origin in regard to the formation of coals from humic matter or peat. It is apparently not without significance that in a country of the extent of the United States, which today is neither extremely cold toward the north nor extends into the tropical regions in the south, the most important accumulations of vegetable matter in nature are not in peat bogs, but in the depths of open waters. A stronger argument derived from the conditions of the present for the aquatic origin of combustible minerals could scarcely be advanced.

It seems clear that improvements in botanical technique have brought within sight the settlement of the long dispute in regard to the mode of origin of what must be regarded both as the most valuable and the most abundant of all minerals. Coal is the universal industrial energy-producing and deoxidizing agent, since it is the only considerable mineral substance of natural occurrence which is not combined with large quantities of oxygen. It will be of interest to follow the investigations, now rendered possible, which will tend to establish a relation between the organization of coal and its industrial utilization in connection with the development of power, the manufacture of oil, gas, coke, dyes, antiseptics, high explosives, lampblack, electric carbons, etc.—E. C. JEFFREY.

NOTES FOR STUDENTS

Current taxonomic literature.—J. A. NIEUWLAND (Am. Mid. Nat. 3:265-270. 1914) has described 4 new species of *Lythrum* from the Central and Southern states.—V. NORLIND (Rep. Sp. Nov. 13:401-403. 1914) has published two new species of *Polygala* from Brazil.—F. OSTERMEYER (*ibid.* 395) records a new *Cochlospermum* (*C. Zahlbruckneri*) from Argentina.—N. PATOULLARD (Bull. Soc. Mycol. France 30:345-354. 1914) under the title "Contribution à la Flore Mycologique hypogée du Jura" proposes a new genus (*Stephanospora*) based on *Hydnangium carotaecolor* Berk. & Br.—J. PERKINS (Eng. & Prantl. Nat. Pflanzenf. Ergänzungsheft III, zu II-IV für die Jahre 1905-1912, p. 94. 1914) has proposed the name *Carnegieodoxa* for *Carnegia* Perk., not Britt. & Rose.—F. PETRAK (Ann. Mycologici 12:471-479. 1914) under the title "Beiträge zur Pilzflora von Mähren und Österr.-Schlesien" includes the description of two new genera, namely *Herpotrichiella* and *Leptomassaria*.—R. PILGER (Notizblatt Königl. Bot. Gart. u. Mus. Berlin 6:109-212. 1914) in cooperation with several specialists under the title "Plantae Uleanae novae vel minus cognitae" has published about 130 new species of Pteridophyta and Spermatophyta from South America based primarily on the collections of